


# **Exhibit B**

**6:22-cv-1316**

## NCS's U.S. Patent No. 10,465,445 ("the '445 Patent") and the AirGlide™ Flotation Sub ("AirGlide")

CLAIMS OF THE '445 PATENT	AIRGLIDE™ FLOTATION SUB <sup>1</sup>
<p>28.0 A float tool configured for use in positioning a casing string in a wellbore containing a well fluid, the casing string having an internal diameter that defines a fluid passageway between an upper portion of the casing string and a lower portion of the casing string, the float tool comprising:</p>	<p>The Court has found this preamble is not limiting. If it is found to be limiting, the preamble is met by the AirGlide as follows:</p> <p>Entech's U.S. customer, Halliburton, markets the following AirGlide for use in a casing string placed in a wellbore with fluid:</p> 

<sup>1</sup> All references to the AirGlide™ Flotation Sub are found at:

[https://cdn.brandfolder.io/BQOGXPBX/at/7b244wpsn77xtzktj85k7m/2022-MKTG-CMT-13672\\_AirGlide\\_Sales\\_Data\\_Sheet.pdf](https://cdn.brandfolder.io/BQOGXPBX/at/7b244wpsn77xtzktj85k7m/2022-MKTG-CMT-13672_AirGlide_Sales_Data_Sheet.pdf).  
[Annotations have been added to the images.](#)

## AirGlide™ Floatation Sub

### OVERCOME EXCESSIVE DRAG FORCES TO RUN CASING TO DEPTH

---

#### FEATURES

- » Innovative glass disk disintegrates into fine, sand-like particles upon activation
- » Custom activation pressures can be tailored to wellbore depth and pressures

#### BENEFITS

- » Eliminates the need for a debris barrier
- » Zero risk of plugoff or damage to equipment
- » No debris left after activation for fullbore access
- » Capable of handling differential pressures up to 12,500 psi

#### OVERVIEW

Running casing to depth in highly deviated or horizontal, extended reach wellbores continues to pose a challenge to operators looking to maximize wellbore production. The excessive drag force between the casing and the formation in these wells is difficult to overcome. For larger casing, the drag forces often exceed the available hook weight of the casing and for smaller casing they exceed the buckling capacity. In both cases, the result is an inability to run casing to the desired setting depth.

To extend the reach in long lateral wells and reduce the casing/formation drag, operators utilize a floatation sub to float the casing through the horizontal section. Traditional floatation

subs require a debris barrier to catch the ceramic shards left after the tool ruptures and prevent plugoff or damage to float equipment that can lead to nonproductive time (NPT).

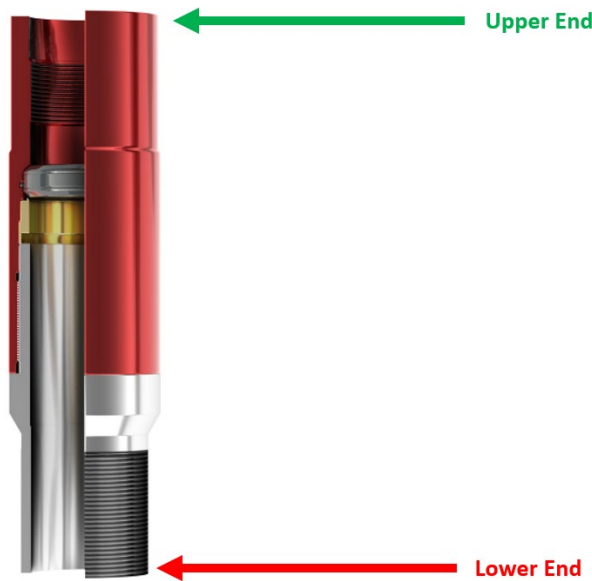
The AirGlide™ floatation sub significantly lowers drag and frictional forces to allow casing to get to bottom faster. Because the AirGlide floatation sub utilizes an innovative glass disk rather than ceramic parts, there is zero risk of plugoff or damage to float equipment and the need for a debris catcher is eliminated.

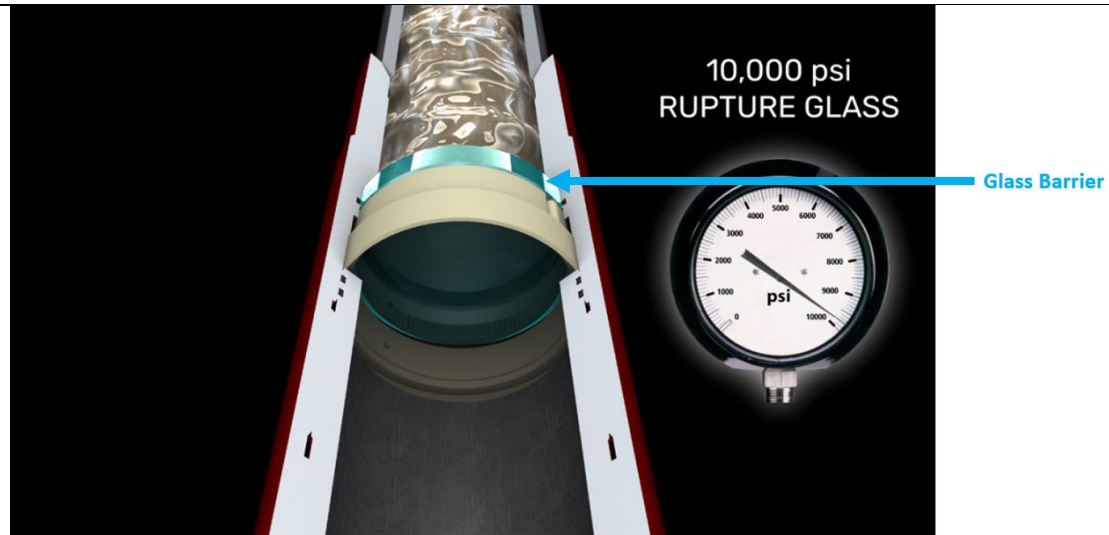
#### IMPROVE CASING RUNNING CAPABILITIES

The AirGlide floatation sub operates when placed in the heel of the wellbore. An innovative glass disk acts as a barrier to fluids in the well to trap an atmospheric chamber in the horizontal section of the casing from the shoe track to the casing floatation sub. This trapped air creates a buoyant chamber that can significantly reduce the casing weight and allows the casing string to lift away from the wellbore, thus reducing drag between the casing and the formation to provide improved casing running capabilities.

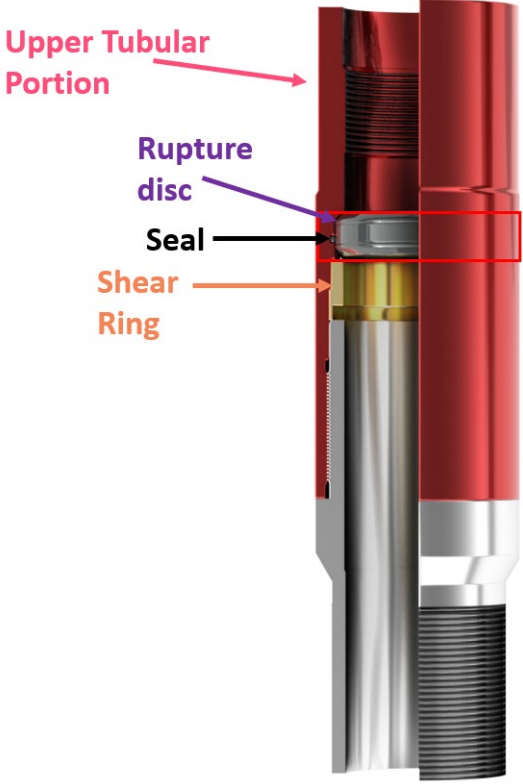
#### FULLBORE ACCESS WITH ZERO DEBRIS

Once targeted depth is reached, applied pressure activates the AirGlide floatation sub. The glass disk handles differential pressures up to 12,500 psi to withstand shocks during handling and

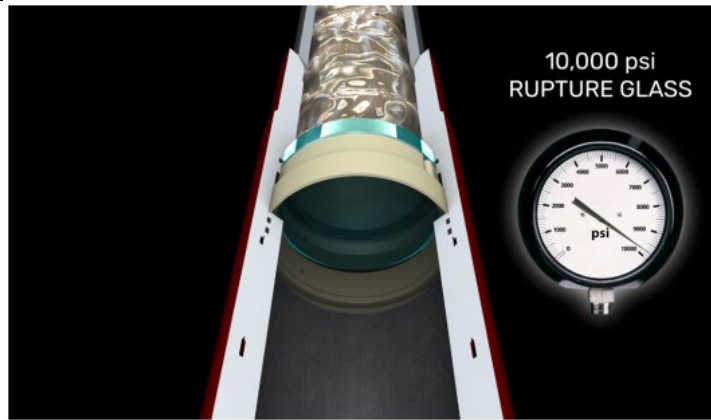
		The casing string has an internal diameter for passing fluid between an upper portion of the casing string and a lower portion of the casing string.
28.1	a rupture disc assembly comprising (i) a tubular member having an upper end and a lower end, the upper and lower ends configured for connection in-line with the casing string and	<p><i>See</i> element 28.0. The AirGlide (i.e. a “rupture disc assembly”) is a tubular member that has an upper end (below <b>green</b> arrow) and a lower end (below <b>red</b> arrow). The upper and lower ends of the AirGlide can be connected in-line with the casing string:</p> 
28.2	(ii) a rupture disc having a rupture burst pressure and in sealing engagement with a region of the tubular member within the upper and lower ends	As shown below, the AirGlide (i.e. “rupture disc assembly”) includes a glass barrier (i.e., a “rupture disc,” below <b>blue</b> arrow).



The glass barrier has a rupture burst pressure. The glass barrier, based on shape and material, is designed to have a certain rupture burst pressure, which is the differential hydraulic pressure acting across the surface of the disc that would rupture the disc. Indeed, any material and geometry used to make the glass barrier must have a rupture burst pressure by basic physics.

		 <p>Referring to the above image, during run in of the AirGlide, the glass barrier is fixed axially and laterally in a region of the tubular member (<b>red box</b>) located within the upper and lower ends of the tubular member by a shear ring (<b>orange arrow</b>) and the inner surface of an upper tubular portion (<b>pink arrow</b>). The upper tubular portion has a groove that holds an O-ring seal (<b>black arrow</b>), such that there is a substantially fluid-tight seal between the glass barrier and the inner surface of the upper tubular portion. As such, the glass barrier has a substantially fluid-tight seal in a region within the upper and lower ends of the tubular member.</p>
28.3	wherein the rupture disc is configured to disengage from sealing engagement when	The glass barrier, based on its shape, size, material, and positioning in the AirGlide, is configured to move, before rupturing, relative to the region in the downhole direction.

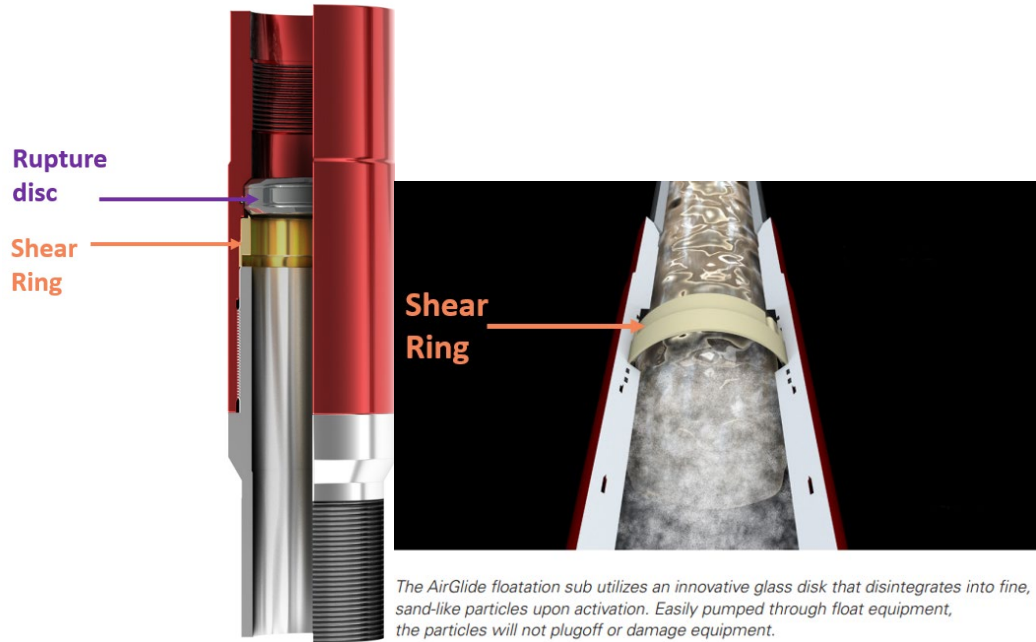
	<p>exposed to a pressure greater than a hydraulic pressure in the casing string after the casing string has been positioned in the wellbore</p>	<p>To disengage the disc, hydraulic pressure acting on the surface of the disc is steadily increased to an activation pressure (i.e. a disengaging pressure):</p> <div data-bbox="932 337 1253 406"> <p>capacity. In both cases, the result is an inability to run casing to the desired setting depth.</p> </div> <div data-bbox="932 418 1253 537"> <p>To extend the reach in long lateral wells and reduce the casing/formation drag, operators utilize a floatation sub to float the casing through the horizontal section. Traditional floatation</p> </div> <div data-bbox="1287 367 1522 406"> <p><b>FULLBORE ACCESS WITH ZERO DEBRIS</b></p> </div> <div data-bbox="1287 423 1619 542"> <p>Once targeted depth is reached, applied pressure activates the AirGlide floatation sub. The glass disk handles differential pressures up to 12,500 psi to withstand shocks during handling and</p> </div> <div data-bbox="932 672 1167 695"> <p><b>HALLIBURTON</b></p> </div> <div data-bbox="932 860 1239 880"> <p><b>CASING EQUIPMENT   Specialty Tools</b></p> </div> <div data-bbox="932 954 1619 1047"> <p>well operations but disintegrates into fine, sand-like particles upon activation. These sand-like fragments are easily pumped through float equipment with no risk of plugoff or damage to equipment, thus leaving a fullbore inner diameter (ID) casing for cementing and completions operations.</p> </div> <div data-bbox="932 1078 1451 1118"> <p><b>OVERCOME DRAG FORCES TO REACH PLANNED DEPTH AND MAXIMIZE PRODUCTION</b></p> </div> <div data-bbox="932 1135 1591 1279"> <p>The AirGlide floatation sub allows operators to overcome excessive drag forces and reach planned depth to maximize production in highly deviated or horizontal, extended reach wellbores. Through use of an innovative glass disk, the AirGlide floatation sub can lift the casing string away from the wellbore to reduce drag between the casing and the formation to provide improved casing running capabilities and leave zero debris after actuation for a fullbore drillout.</p> </div>
--	---	---

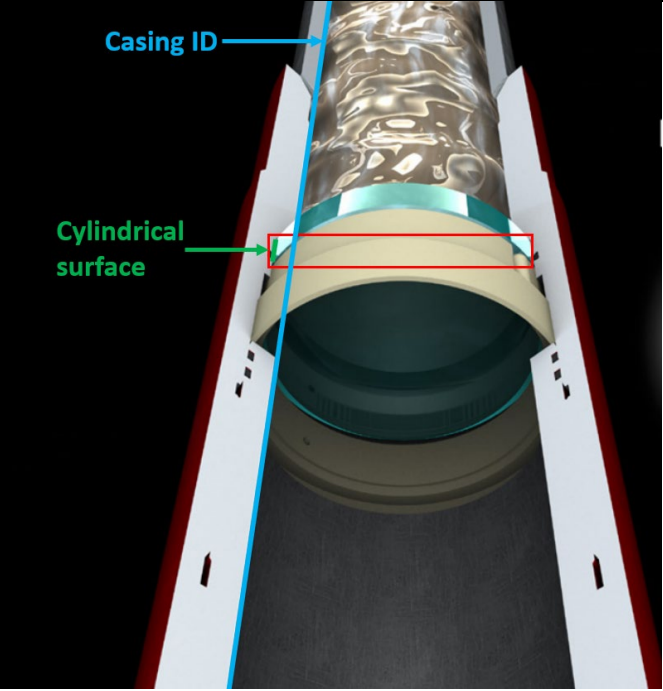


*Applied pressure activates the AirGlide floatation sub once targeted depth is reached.*

At the activation pressure, the shear ring (below **orange arrow**) shears and the glass barrier (below **purple arrow**) moves relative to the region in the downhole direction (downwards in the image). The disc ruptures when it impacts a surface in the AirGlide (show in image to the left):



		 <p>The diagram shows a cross-section of the AirGlide flotation sub assembly. A red outer casing is shown with a silver inner tube. A purple arrow points to a grey disc labeled 'Rupture disc'. An orange arrow points to a yellow ring labeled 'Shear Ring'. An inset image shows the internal view of the sub, with a yellow ring labeled 'Shear Ring' and a grey disc. Below the inset, text reads: 'The AirGlide flotation sub utilizes an innovative glass disk that disintegrates into fine, sand-like particles upon activation. Easily pumped through float equipment, the particles will not plugoff or damage equipment.'</p>
28.4	and the region of the tubular member where the rupture disc is attached has a larger internal diameter than the internal diameter of the casing string and is parallel to the internal diameter of the casing string.	<p>In the region of the tubular member (identified in element 28.2 and again below by <b>red box</b>), the rupture disc is directly secured to and has a substantially-fluid-tight seal to a cylindrical surface (<b>green line</b>). The cylindrical surface is wider than and parallel to the inner surface of the casing string, as shown in the below comparison between the cylindrical surface and the inner surface of the casing string (<b>blue line</b>):</p>

		
29.	<p>The float tool recited in claim 28 wherein the rupture disc is further configured to rupture when exposed to a rupturing force greater than the rupture burst pressure and the pressure greater than the hydraulic pressure is less than the rupture burst pressure.</p>	<p><i>See</i> claim elements 28.2-28.3. The activation pressure (i.e. the hydraulic force acting on the disk) that can cause the glass barrier to move relative to the region is less than the glass barrier's rupture burst pressure.</p>